# Jaclyn B. Champagne

JASPER Postdoctoral Scholar | Steward Observatory Office 314 | Tucson, AZ

jackiechampagne.com jbchampagne@arizona.edu jbchampagne 732-580-5134

## EDUCATION

**University of Texas Austin** **Austin, TX**
*Ph.D., Astronomy* *Aug. 2022*
Thesis: "Constraining the Environments of Galaxy Protoclusters at $2 < z < 6$", Supervisor: Prof. Caitlin Casey

*M.A., Astronomy* *Aug. 2018*
Thesis: "No Evidence for 1.2 mm Source Overdensities in the Fields of $z \geq 6$ Quasars," Supervisor: Prof. Caitlin Casey

**Rutgers, State University of New Jersey** **New Brunswick, NJ**
*B.S., Physics & Astrophysics* *May 2016*
Summa Cum Laude with Highest Honors in Physics,
Supervisor: Prof. Charles Keeton

## EMPLOYMENT

**University of Arizona Steward Observatory** **Tucson, AZ**
*JASPER Postdoctoral Scholar* *Sept. 2022–present*
Supervisor: Prof. Xiaohui Fan

## RESEARCH INTERESTS

Reionization-era quasars and environments, galaxy protoclusters, large-scale structure, dusty star-forming galaxies, high-redshift galaxy evolution, infrared/submillimeter/radio observations

## Collaborations

EREBUS/ASPIRE: A Quasar Legacy Survey; COSMOS; CEERS

## RESEARCH EXPERIENCE

**Graduate Research Assistant** *2016–2022*
UT Austin, Supervisor: Prof. Caitlin Casey

**Research Intern** *Summer 2015*
Max Planck Institute for Astronomy, Supervisor: Dr. Fabian Walter

**NSF REU Scholar** *Summer 2014*
Cornell University, Supervisor: Prof. Dominik Riechers

**Senior Peer Instructor** *2014–2016*
Aresty Research Center for Undergraduates, Rutgers University, Supervisor: Prof. Charles Keeton

## DATA & OBSERVING EXPERIENCE

**Atacama Large Millimeter Array** *2019*
15 hours awarded Cycle 7, PI: J. Champagne

**Australian Telescope Compact Array** *2019, 2020*
15 nights total, PI: H. Dannerbauer

**Hubble Space Telescope** *2017*
Reduction and photometry of 13 orbits ACS/WFC3 imaging in Cycle 25, PI: C. Casey

**Jansky Very Large Array** *2016*
Reduction and imaging of 46 hours total in Semester 2015B, Pi: C. Casey

**James Webb Space Telescope** *2022*
Extensive custom data reduction for NIRCam broadband imaging and grism spectroscopy for the ASPIRE medium-size program, PI: F. Wang

**LCO - Magellan** *2022*
Two nights observing on FIRE, FOURSTAR, and IMACS, PI: J. Yang

**Submillimeter Array** *2020*
1 night awarded for SMA Interferometry School 2020
6 tracks awarded (A-rated) Semester 2020A, PI: J. Champagne

## AWARDS & ACHIEVEMENTS

Submillimeter Array Fellowship, 2022 *(declined)*
NRAO Jansky Fellowship, 2022 *(declined)*
Waterloo Centre for Astrophysics Fellowship, 2022 *(declined)*
Beatrice Tinsley Graduate Fellowship, UT Astronomy Department, Summer 2022
University Continuing Graduate Fellowship, UT Austin Graduate School, 2020-2021
Professional Development Award ($625 for conference travel), UT Austin Graduate School, 2019
National Science Foundation Graduate Research Fellowship, Honorable Mention 2016, 2018
Astronomy Excellence Fellowship, UT Austin College of Natural Sciences, 2016
Chambliss Astronomy Achievement Student Award, American Astronomical Society, 2015
Rutgers University Department of Physics Scholarships: Mohan S. Kalelkar (2016), Mary Wheeler Wigner (2015), and Noemie B. Koller (2014) Awards
Rutgers School of Arts & Sciences Presidential Scholarship, 2012–2016

## SERVICE

**Graduate Student Representative** *2018–2019, 2021–2022*

- Liaison between astronomy graduate students and faculty, including attendance at faculty meetings, participation in graduate admissions, representing students in faculty hiring process, and peer mediation between students
- Represent astronomy graduate students in monthly meetings of the UT Graduate Student Assembly

**Journal Referee** *2021–present*

- Scientific reviewer for the *Astrophysical Journal* and *Astronomy & Astrophysics*

## INVITED PRESENTATIONS

**"Revealing the Environment around a Luminous $z = 6.6$ Quasar with JWST"**
Invited Talk
*NASA/Goddard AGN Seminar* *May 2024*

**"Extreme Environments at $2 < z < 7$: A Gallery of Protocluster Case Studies"**
Invited Talk
*First Structures in the Universe 2023* *September 2023*

**"The Hunt for Galaxy Protoclusters around the Earliest Quasars"**
Invited Seminar Talk
*ESO Santiago AGN Meeting* *December 2022*

**"Hunting for Ancient Galaxy Clusters in the Radio Universe"**
Invited Prize Lecture
*Beatrice Tinsley Lecture* *August 2022*

**"A Protocluster Core Caught in the Beginning of Virialization"**
Invited Seminar Talk
*Harvard CfA Galaxy Cluster Group Meeting* *November 2021*

**"Comprehensive Gas Characterization of a $z = 2.5$ Protocluster:**
A Cluster Core Caught in the Beginning of Virialization?"
Invited Seminar Talk
*Princeton University, Galread* *September 2021*

## CONTRIBUTED PRESENTATIONS

**"Revealing the Environment around a Luminous $z = 6.6$ Quasar with JWST"**
Contributed Talk
*Extreme Galaxies in Extreme Environments at Extremely Early Epochs* *April 2024*

**"First Characterization of [OIII] Emitters in the Field of a z=6.6 Quasar"**
Contributed Talk
*First Light Boston, EAS Krakow* *June 2023*

**"Searching for LBG Overdensities in the Fields of $6 < z < 7$ Quasars"**
Local Seminar Talk
*UT Austin ExGal Seminar* *October 2021*

**"The highest redshift cluster core at $z = 2.5$: is it too good to be true?"**
E-poster by J. B. Champagne, C M. Casey, J. A. Zavala, H. Dannerbauer, et al.
*Protoclusters: Galaxies in Confinement* *August 2020*

**"Molecular Gas Characterization of a Complex Galaxy Cluster Progenitor at $z = 2.5$"**
Contributed talk+poster by J. B. Champagne, C M. Casey, J. A. Zavala, H. Dannerbauer, et al.
*2019 COSMOS Team Meeting* *May 2019*
*IAU Symposium 352: Uncovering early galaxy evolution in the ALMA and JWST era* *June 2019*

**"No Evidence for 1.2 mm Dust Continuum Overdensities around $z > 6$ Quasars"**
Poster by J. B. Champagne, R. Decarli, C. M. Casey, F. Walter, B. Venemans, et al.
*Astrophysical Frontiers, Portland, OR* *June 2018*
*Large Scale Structure Summer School, Berlin, Germany* *July 2018*

**"Molecular Gas Content of SMGs in a $z = 2.47$ Starbursting Protocluster"**
Poster by J. B. Champagne, C. M. Casey, D. B. Sanders, C. Hales, et al.
*SMG20: Twenty Years of Submillimeter Galaxies, Durham University* *August 2017*
*Bash Fest, University of Texas Austin* *October 2017*

**"Simulated Observations of CO(2-1) and CO(1-0) in DSFGs at $2 < z < 4$"**
Poster by J. B. Champagne, C. M. Casey, C.-L. Hung, D. Narayanan, C. Carilli, et al.
*next generation Very Large Array (ngVLA) Community Studies Meeting* *June 2017*

## PROFESSIONAL DEVELOPMENT & PUBLIC OUTREACH

**Black Hole Fusion Camp** *2024*
- Delivered demonstrations and lessons to 3rd-5th graders at Flandrau Planetarium's Fusion Camp

**Science Writing for the Public** *2023–present*
- Popular science article "Powerful black holes might grow up in bustling galactic neighborhoods" published in The Conversation

**Computational Research Access NEtwork (CRANE) Instructor** *2022–present*
- Lead instructor for Astronomy Data Analysis unit of CRANE, an NSF-supported virtual teaching network designed to provide undergraduates with computational research methods

**Space Drafts Tucson** *2023–present*
- Help organize events and recruit speakers, sell merchandise, lead monthly public science talks including "Astronomy in the News"

**TAURUS Summer Program Student Organizer** *2017–2022*
- Organize student seminars including research presentations, career advice panels, and observing workshops; participated in peer mentoring program

**UCSC Institute for Science & Engineer Educators (ISEE) Professional Development Program (PDP)** *2019, 2020, 2024*
- Inquiry Design Team Leader for an undergraduate inquiry activity delivered to Akamai Workforce Initiative summer interns (2024)
- Inquiry Design Team Leader (cancelled 2020 due to COVID-19), began development of a galaxy classification activity for undergraduates
- Inquiry Design Team Member (2019), participated in 6-month inquiry teaching workshop and helped develop and deliver a galaxy spectral classification activity for undergraduate summer scholars (TAURUS)

**Astronomy on Tap ATX** *2016–2022*
- Help organize events and recruit speakers, lead social media advertising, give monthly public science talks including "Astronomy in the News"

**Association of Women in Astronomy Research & Education (AWARE)** *2016-2022*
- Co-organize yearly Girl Day event and lead astronomy demonstrations for K-12 students

## TEACHING & MENTORING

**Undergraduate Research Advising** *Summer 2024*
Lorraine Marcelin

**Teaching Assistant** *Spring 2020*
AST376: Observational Techniques in Astronomy, UT Austin

**Teaching Assistant** *Spring 2018*
AST307: Introductory Astronomy, UT Austin

**Seminar Leader for Python Crash Course** *2017–2021*
Texas Astronomy Undergraduate Research for Underrepresented Students (TAURUS)
Developed and lead a yearly 10-hour programming crash course on bash scripting and introductory Python, including lectures and exercises (available publicly at github.com/jbchampagne/pythontutorials/)

**Undergraduate Teaching Assistant** *Fall 2015*
Analyzing the Universe, Rutgers University

## PUBLICATIONS ORCID: 0000-0002-6184-9097

**Refereed and Working Papers (First Author)**

6. Champagne, J.B. et al. *Spatially Resolved Molecular Gas in the Spiderweb Protocluster: No evidence for enhanced star formation efficiency in DSFGs.* 2024, in prep.

5. Champagne, J. B. et al. *A Quasar-Anchored Protocluster at $z = 6.6$ in the ASPIRE Survey II. An Environmental Analysis of Galaxy Properties in an Overdense Structure.* 2024b, submitted to ApJ.

4. Champagne, J. B. et al. *A Quasar-Anchored Protocluster at $z = 6.6$ in the ASPIRE Survey I. Properties of [OIII] Emitters in a 10 Mpc Overdense Structure.* 2024a, submitted to ApJ.

3. **Champagne, J. B.**, Casey, C. M., Finkelstein, S. L., Bagley, M., Cooper, O., Larson, R., Long, A., Wang, F. *A Mixture of LBG Overdensities in the Fields of Three $6 < z < 7$ Quasars: Implications for the Robustness of Photometric Selection* **2023**, ApJ, 952, 99C

2. **Champagne, J. B.**, Casey, C. M., Zavala, J. A., Cooray, A., Dannerbauer, H., Fabian, A., Hayward, C. C., Long, A. S., Spilker, J. S. *Comprehensive Gas Characterization of a $z = 2.5$ Protocluster: A Cluster Core Caught in the Beginning of Virialization?* **2021**, ApJ, 913, 110

1. **Champagne, J.B.**, Decarli, R., Casey, C. M., Venemans, B., Bañados, Eduardo, Walter, F., Bertoldi, F., Fan, X., Farina, E. P., Mazzucchelli, C., Riechers, D. A., Strauss, M. A., Wang, R., Yang, Y. *No Evidence for Millimeter Continuum Source Overdensities in the Environments of $z \geq 6$ Quasars.* **2018**, ApJ, 867, 153

**Refereed Papers (Co-Author)**

- Jin, X. *JBC, et al. A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): JWST Supports Earlier Reionization around [OIII] Emitters* **2024**, submitted to ApJ
- Akins, H. *JBC, et al. COSMOS-Web: The over-abundance and physical nature of "little red dots'—Implications for early galaxy and SMBH assembly* **2024**, submitted to ApJ
- Perez Martinez, J. *JBC, et al. COALAS III: The ATCA CO(1-0) look at the growth and death of H$\alpha$ emitters in the Spiderweb protocluster at $z = 2.16$* **2024**, submitted to A&A
- Lin, X. *JBC, et al. A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): Broad-line AGN at z=4-5 revealed by JWST/NIRCam WFSS* **2024**, submitted to ApJL
- Zou, S. *JBC, et al. A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): Impact of Galaxies on the Circumgalactic Medium Metal Enrichment at $z > 6$ Using the JWST and VLT* **2024**, ApJL, 963, L28
- Pudoka, M. *JBC, et al. Large Scale Overdensity of Lyman Break Galaxies Around the $z = 6.3$ Ultraluminous Quasar J0100+2802* **2024**, accepted to ApJ
- Wang, F. *JBC, et al. A Massive Protocluster Anchored by a Luminous Quasar at $z = 6.63$* **2024**, ApJL, 962, L11
- Lambrides, E., *JBC, et al. Uncovering a Massive z$\sim$7.65 Galaxy Hosting a Heavily Obscured Radio-Loud QSO Candidate in COSMOS-Web.* **2023**, ApJL, 961, L25
- Franco, M., *JBC, et al. Unveiling the distant Universe: Characterizing $z \geq 9$ Galaxies in the first epoch of COSMOS-Web.* **2023**, submitted to ApJ

- Chen, Z., *JBC, et al. COALAS II. Extended molecular gas reservoirs are common in a distant, forming galaxy cluster.* **2023**, MNRAS 527, 3, pp. 8950-8972
- Wang, F., *JBC, et al. A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): JWST Reveals a Filamentary Structure around a z=6.61 Quasar* **2023**, ApJL, 951, L4.
- Yang. J, *JBC, et al. A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): A First Look at the Rest-frame Optical Spectra of z>6.5 Quasars Using JWST.* **2023**, ApJL, 951, L5.
- McKinney, J., *JBC, et al.. A Near-Infrared Faint, Far-Infrared-Luminous Dusty Galaxy at $z \sim 5$ in COSMOS-Web.* **2023**, submitted to ApJ. arxiv:2304.07316v1.
- Larson, R., *JBC, et al.. A CEERS Discovery of an Accreting Supermassive Black Hole 570 Myr after the Big Bang: Identifying a Progenitor of Massive $z > 6$ Quasars.* **2023**, submitted to ApJ. arXiv:2303.08918.
- Zavala, J. A., *JBC, et al. Dusty Starbursts Masquerading as Ultra-high Redshift Galaxies in JWST CEERS Observations.* **2023**, ApJL, 943, L9
- Casey, C. M., *JBC, et al. COSMOS-Web: An Overview of the JWST Cosmic Origins Survey.* **2023, in press**, ApJ
- Long, A. S., *JBC, et al. Missing Giants: Predictions on Dust-Obscured Galaxy Stellar Mass Assembly Throughout Cosmic Time.* **2023, submitted**, ApJ
- Zavala, J. A., *JBC, et al. Probing Cold Gas in a Massive, Compact Star-forming Galaxy at $z = 6$.* **2022**, ApJ, 933, 242
- Cooper, O. R., Casey, C. M., Zavala, J. A., **Champagne, J. B.**, da Cunha, E., Long, A. S., Spilker, J. S., Staguhn, J. *Searching Far and Long I: Pilot ALMA 2mm Follow-up of Bright Dusty Galaxies as a Redshift Filter*. **2022**, ApJ, 930, 32
- Casey, C. M., *JBC, et al. Mapping Obscuration to Reionization (MORA): 2mm Efficiently Selects the Highest-Redshift Obscured Galaxies.* **2021**, ApJ, 923, 215
- Manning, S. M., *JBC, et al. Characterization of Two 2 mm-detected Optically-Obscured Dusty Star-Forming Galaxies.* **2021**, ApJ, 925, 23
- Zavala, J. A., *JBC, et al. On the Gas Content, Star Formation Efficiency, and Environmental Quenching of Massive Galaxies in Proto-Clusters at $z \approx 2.0 - 2.5$.* 2019, ApJ, 887, 183
- Jin, S.,*JBC, et al. COALAS: I. ATCA CO(1-0) survey and luminosity function in the Spiderweb protocluster at $z = 2.16$*, **2021**, Astronomy & Astrophysics, 652, A11
- Casey, C. M., *JBC, et al. Physical Characterization of an Unlensed, Dusty Star-forming Galaxy at z = 5.85*, **2019**, ApJ 887, 55

**White Papers & Conference Proceedings**

- Casey, C. M., Capak, P., Staguhn, J., Armus, L., Blain, A., Bethermin, M., **Champagne, J. B.** (7 of 27), Cooray, A., et al. *Taking Census of Massive, Star-Forming Galaxies formed $< 1$ Gyr After the Big Bang.* **2019**, Astro2020 White Papers, 2019arXiv190305634C
- Casey, C. M., Narayanan, D., Carilli, C., **Champagne, J. B.** (4 of 12), Hung, C.-L., Davé, R., Decarli, R., Murphy, E. J., Popping, G., Riechers, D., Somerville, R. S., Walter, F. *Imaging Cold Gas to 1 kpc Scales in High-Redshift Galaxies with the ngVLA.* **2018**, ASPC, 517, 629